DOCUMENT RESUME

ED 174 884 CG 013 675

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TITLE Development and Analysis of Vocational Maturity Tests in the Netherlands.
PUB DATE 74
NOTE 14p.; Paper presented at the International Congress of Applied Psychology (18th, Montreal, Canada, 1974)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Career Development; *Cultural Differences; Foreign Countries; High School Students; *Interest Tests; Secondary Education; *Test Construction; *Testing Problems; *Test Validity; *Vocational Maturity
IDENTIFIERS *Netherlands

ABSTRACT

Although this report is several years old, it explores test development in another country, specifically the Netherlands, using American-developed and normed-instruments. The development of vocational maturity tests and the adaptation of Crites' Vocational Developmental Inventory (VDI), Super's Career Development Inventory (CDI) and Westbrook's Cognitive Vocational Maturity Test (CVMT) for use with Dutch students is described. The following areas of concern are addressed: (1) the untranslatability of some test items due to different school situations; (2) identification of the appropriate Dutch population with which to use the tests; (3) problems with internal consistency; and (4) distinctions between the measurement of vocational attitudes and testing of occupational information. (HLM)

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Development and analysis of vocational maturity tests in The Netherlands[1]

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1. In this paper I will give a brief report of the work that we have done in the University of Amsterdam on the development of vocational maturity tests.

It started in 1971 with the intention to develop instruments for the evaluation of vocational guidance programs and for the diagnosis of the client's level of vocational development before counseling.

We began with the adaptation of the Vocational Development Inventory, published by Prof. Crites[2] and with the construction of a Dutch occupational information test. Afterwards the project was extended with the adaptation of the Career Development Inventory that Prof. Super[3] made available to us and the Cognitive Vocational Maturity Test which was given us by Prof. Westbrook.[4]

Because time is limited I can only give brief summaries of these related projects that were carried out independently, but that had in common that we tried to construct homogeneous scales on the basis of item- and factor-analysis.

Reporting our results, I will tell in succession about the adaptation and further development of each of the three American tests. After that I shall present the outcomes of a study in which we have correlated and factoranalyzed all the resulting scales.

That will bring me to a few general conclusions about the distinction of different kinds of attitudes with regard to vocational decision making and about the possibility of measuring occupational information as an aspect of vocational maturity. As to the Dutch occupational informa-

[1] Paper presented to the 18th International Congress of Applied Psychology (Montreal, 1974) in a Symposium on „Vocational maturity: Cross-national studies of adolescent career development".

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tion test, I must confine myself to presenting those details that are relevant for the general conclusions of our work.

I am indebted to Professors Super, Crites and Westbrook for making their instruments available and also to the graduate students in psychology who cooperated in this project. Their names are in the tables.

Finally I thank my colleagues of the N.I.B. vocational guidance agency in West-Holland, with whom we collaborated in the translation of the C.D.I. and the collection of data for the tryout of that test.

The most important problem that we encountered in the adaptation of American vocational maturity tests is the untranslatability of some items because of quite different school-situations. In general we have solved it by formulating completely new questions in the same domain as the original items and making them as equivalent as possible.

Another problem was to which Dutch population the tests would be adapted. The American tests are applicable in the High School. In The Netherlands however, there is not an equivalent of that type of school.

In Table 1 a scheme is given of the structure of the Dutch educational system. I hope that it makes clear that after the elementary school, children are distributed over a number of schools of unequal difficulty and unequal number of years.

In the schools for continued general education, the first years offer no possibilities for choice of subjects, but at about 15 years of age, a choice has to be made that has some consequences for the possibility to follow specific vocational training or university programs. For example, having omitted mathematics will prevent one from being admitted in university or professional science and engineering programs.

The double line in table 1 indicates the population for which we have made the vocational maturity tests applicable.

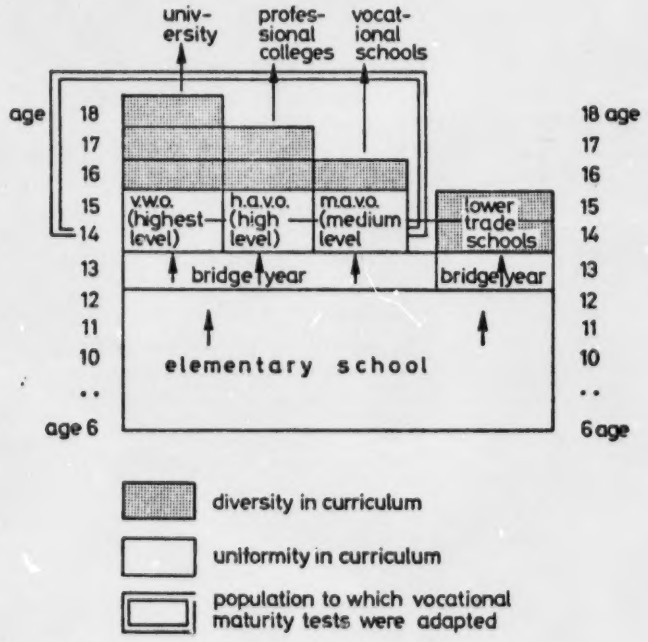
2. The first project I will tell about is the adaptation of the *Career Development Inventory* of Prof. Super and associates.

We have translated the C.D.I. as literally as possible, to promote cross-national comparison. That was possible, because the reading level of the questions seemed to fit our student population.

We started with two independent translations, one made by Drs. Koo-

len of the N.I.B., the other by ourselves. We reached consensus about these translations and added a number of substitutes for untranslatable items. Our pool of Dutch items consisted at last of 30% more questions than the total number in the original American version.

Table 1: Dutch educational system.



From this tryout inventory we wanted to select the best items to use them for the construction of homogeneous scales and about these scales we were interested to know if they would compare with the subscales of the American test.

As you know, three scores can be derived from the C.D.I., corresponding with three independent factorial dimensions and called scales A,

B and C. We got data by administrating our tryout version to a number of students.
Because the C.D.I. consists of two types of items we have applied two different methods of analysis.
The questions of scales A en B are answered on five-point rating-scales. We had 78 items of this kind and we have factor-analyzed them alltogether. Table 2 gives the results of this study.
After a principle components solution we have done Varimax-rotations and concluded that the two-factor solution was the most clearly interpretable one.
Selecting the items with the highest factor loadings and the highest standard deviations we found for the first factor a scale with a high internal consistency.
This scale consists of questions from the A-scale part of the American version and therefore we shall also call it *A-scale*.
The items that load highest on the A-factor are estimates, made by the student himself, of his amount of knowledge of his preferred occupation. This knowledge concerns for example the ways of entering the profession and the education and training needed. These statements indicate that a student has made his plans and knows what he will do.
Other items express how much thought a student has given to his choise. Planning orientation, as the American A-scale is called, seems to be a good description of the Dutch A-scale as well.

Table 2: Career Development Inventory, Dutch adaptation

(J. C. Helbing, J. v. d. Bel, P. Koolen (NIB).
N = 742 boys and girls, 15-18 years.
Factor analysis of items scale A + B: (78 items)

Principle components:	Eigenvalues	% of variance
15 eigenvalues	1. 10.27	13.17
greater than 1.0	2. 4.50	5.77

Varimax rotation 2 factors; resulting Dutch scales:
A: 30 items, mean 91.68, S.D. 18.29, K.R. 20 = .89
B: 23 items, mean 65.51, S.D. 11.46, K.R. 20 = .81
Correlation between scale-sumscores: .28

Selecting items with high loadings on the second factor we could construct a scale with a pretty high internal consistency that corresponds to the original *B-scale.*
The questions in this section are all concerned with the use of information services, for example:
- Visit meetings for occupational and educational information.
- Ask career information officials for help.
- Use information programs on television and radio.

It seems therefore correct to label our B-scale „Resources for exploration" like the original American scale is called.
The questions of the C.D.I.-. C-scale are not answered on fivepoint scales like those of the A- and B-scales, but they are multiple choice items, testing knowledge of occupational information and insight in the solution of vocational decision making problems. Our tryout version consisted of 40 items of this kind. For the analysis of this scale we preferred another method of analysis than with the A- and B-scales. We computed item-test correlations and p-values.
Although there were enough questions that were not too easy or too difficult, the correlations were generally so low that in no way we could construct a scale with a higher internal consistency than K.R. 20 = .38.
So as for the C.D.I.-adaptation, the conclusion is that we could construct Dutch equivalents of the A- and B-scales, but that the development of the C-scale failed.

3. Our second project deals with the *Attitude Scale of the Vocational Development Inventory,* published by Prof. Crites. This scale consits of a number of attitude statements, for example: „Trying to choose an occupation is one of the hardest things I've ever done", — Agree or disagree?
The development of the Dutch modification took place in three stages:

3.1 In the first phase we selected the 79 items that seemed to be most suitable for use in The Netherlands from the different versions of the Attitude Scale Crites has published.
Because the original items deal with occupational choice in particular and I wanted to construct an instrument that could also be used with

career guidance in school settings, we have formulated 39 own items, consisting of statements about attitudes with respect to the choice of school subjects.
In an instrument to be used for the evaluation of guidance programs, I wanted to avoid items of which the relevance could be debated by the personnel whose work would be judged.
Therefore we gave the 118 items to 25 vocational counselors and asked them to indicate in which way vocationally mature children should answer each item. When we omitted the items with less than 75% agreement, only 48 items from the V.D.I. and 28 own items remained. For these items we accepted the answers that were endorsed by most of the counselors as the correct ones.
Many of the lost items were ambiguous in the eyes of the judges: to agree with the statement could be seen as an indication of mature behaviour, but to disagree could also be interpreted in that way. Another category of items that we lost were those that deal with what Crites has called „preference", for example: „I want an occupation which pays good money". Preference-statements were not seen as relevant for vocational maturity by Dutch counselors.

3.2 *Phase 2* consisted of a tryout of the remaining 76 items. Here the analysis showed low correlations between the items.
To get a preliminary impression of the structure of the test, we have done a clusteranalysis. The results were 3 clusters, one of 14 items, one of 13 and one 3.
In each were items from the V.D.I. as well as from our own pool of statements on educational choice. Altogether not enough items were left to construct homogeneous scales. Therefore we needed another development stage.

3.3 In that *third phase* we added at first 41 new statements to our 27 cluster-items. It was my intention to enlarge the clusters to factor-homogeneous scales and therefore we formulated only statements in the domains of the 3 clusters.
For psychometric reasons we used 6 point rating scales this time instead of the agree-disagree answer format.
We tried the new list with 615 students and factoranalyzed the results.

As expected we found three factors, corresponding to the three clusters of phase 2. Table 3 gives details about them.

Table 3: Vocational Development Inventory, Dutch modified reconstruction.
(J. C. Helbing, F. Rijnders, G. Versolato)
N = 615 boys and girls, 15-18 years.
Third construction phase, factor analysis of 68 items.

Principle components:	Eigenvalues	% of variance
18 eigenvalues	1. 10.84	15.7
greater than 1.0	2. 4.95	7.2
	3. 2.65	3.8

Varimax rotation 3 factors; resulting Dutch scales:
P: 19 items, mean 90.47, S.D. 14.70, K.R. 20 = .84
Q: 19 items, mean 60.91, S.D. 17.90, K.R. 20 = .87
R: 10 items, mean 29.84, S.D. 8.89, K.R. 20 = .73

Correlations between scale-scumscores:
PQ = —.19 PR = —.4[illegible] QR = .32

The factorial composition of our test does not quite correspond with the model that Crites has proposed on the basis of theoretical consideration. Within the factor vocational choice attitudes he distinguished five dimensions, namely involvement, orientation, independence, preference and conception.
As I told before, we lost the preference-items in phase one of this research.
Independence and conception did not appear as clusters in phase 2. What we did find were involvement and orientation, plus indecision, an aspect that is not represented in the quintet of attitude dimensions but that is discussed in the chapter on vocational problems in Crites' book „Vocational Psychology".
Taking the highest loading items from factor 1 we derived *scale P* with 19 items. It has a high internal consistency.

Typical items were:

- Considering my choice of school subjects I mind in particular what I want to be in the future.
- I do not think much about the choice of school subjects, further education or an occupation, because I don't care.
- Choosing an occupation is one of the most important decisions in your life. Summarizing the meaning of this scale we may call it Involvement or concern about choice.

From factor 2 we selected the 19 highest loading items to form *scale Q*, a very homogeneous scale.

The most representative items are:

- Everyone seems to tell me something different; until now I don't know which occupation to choose.
- There are so many occupations that can be chosen that I cannot reach a decision.
- I have not yet an idea which occupation will fit me best. The scale is called *in*decision because most of the items are formulated negatively.

Factor 3 provided *scale R* with 10 items and a reasonable internal consistency.

The highest loading items on this scale are:

- It makes me sick when I realize that I shall have to work whole my life.
- Sometimes I wish one would never need to work.
- I think that man should live to make fun and not to work. The direction of this scale is reversed. A high score means a negative work-orientation.

The attitude scales that we developed can better called „variations on a theme of Crites" than a real adaptation of the V.D.I. In our three final scales only 30% of the items are translations of V.D.I.-statements.

4. The third test that we have tried to adapt is Prof. Westerook's *Cognitive Vocational Maturity Test*. It consists of 120 multiple choice items that measure what a student knows about different aspects of occupations, like the economical or industrial field to which an occupa-

tion belongs, the specific duties of the worker, the work conditions, and the educational and psychological requirements of specific occupations.

The Dutch tryout version counted only 88 items because we had not enough time in the school to occupy the students with a longer version. We omitted a number of questions about lower-level occupations that were not relevant for our student-population.

The results of our tryout were disappointing. Many items turned out to be too easy and the correlations between the items were very low, only 10 of them being higher than .30.

Factor analysis showed only one factor.

Selecting items that loaded high on that factor we could construct a scale of only 17 items, with a reasonable internal consistency. Table 4 gives some more details.

Table 4: Cognitive Vocational Maturity Test, Dutch abbreviated adaptation (J. C. Helbing and J. Luursema)

N = 480 boys and girls, 15-18 years.

Factor analysis of 88 items.

Principle components: 1 eigenvalue greater than 1.0.

Eigenvalue: 8.7, % of variance: 10

Resulting Dutsch scale:

W: 17 items, mean 13.05, S.D. 3.41, K.R. 20 = .76

This scale might be called *occupational information*, or *W-scale*. 8 of its questions concern job duties and 9 originated from the section job selection, where the respondent is requested to choose the best fitting occupation from the given alternatives for a person with circumscribed capacities, interests and education. In these questions knowledge of job duties is also essential.

So what remained was a very brief and one-sided version of the C.V.M.T. 56% of the questions of this W-scale are translations of original items, 44% are Dutch substitutes.

5. To study the relationship between the scales we have administrated them alltogether to a group of students. We have correlated the adapted scale total scores and factoranalyzed them. The results are given in tables 5 and 6.

Table 5: Correlations between Dutch scales. (J. C. Helbing, G. Versolato) 263 boys and girls, 16-17 years.

	A	B	P	Q	R	W	
CDI-A	–	.27	.41	–.52	–.34	.01	Planning orientation
-B		–	.32	–.05	–.08	–.05	Resources/Exploration
VDI-P			–	–.21	–.39	.14	Involvement
-Q				–	.33	–.03	Indecision
-R					–	–.01	Neg work orientation
CVMT-W						–	Occ. information

(.12 is significant on 0.05 level)

Looking at table 5, scale W, the occupational information scale adapted from the C.V.M.T., shows nearly no correlation with the other scales, which raises some doubt of its validity as a measure of vocational maturity.

Table 6: Factor analysis of Dutch scales. (J. C. Helbing, G. Versolato) 263 boys and girls, 16-17 years.

Principle components:	Eigenvalues	% of variance
3 eigenvalues	1. 2.22	37.0
greater than 1.0	2. 1.05	17.5
	3. 1.02	17.1
		+
		71.6

Varimax rotation 3 factors:

Scale	Factor 1	Factor 2	Factor 3	
CDI-A	*.69*	*.38*	.03	Planning orientation
-B	.08	*.59*	–.05	Resources for exploration
VDI-P	.27	*.52*	*.51*	Involvement
-Q	*–.73*	.00	–.04	Indecision
-R	*–.42*	–.14	*–.34*	Negative work orientation
CVMT-W	.00	–.03	.23	Occupational information

In table 6, factors 1 and 3 are bipolar because of the different directions of the scales. In A, B and P a high score is socially desirable, but in Q and R a low score means mature behaviour.

To arrive at conclusions from our studies, my first impression is that they could be a contribution to the study of vocational choice attitudes. Empirically it seems possible to distinguish three independent attitudinal dimensions;

- In the first place *planful, goal-directed, decided choice behavior,* measured especially by the Planning Orientation scale and the Indecision scale. I prefer the word decided in this connection over decisive, because in both of these scales many items give more information about the fact that the respondent has or has not made decisions and plans than about his tendency to make them or about the way in which he would make them.
- Second there is the dimension of *activity in the prepration of a decision,* measured in particular by the Resources for Exploration scale and the Involvement scale.
- The third dimension is tentatively called *concern about a future as a worker* and it can be measured with the Involvement scale again and with the scale Work Orientation.

The results show that the A-scale of the C.D.I. loads high in the planful decided behaviour factor and the B-scale in the active preparation factor.

In so far the factorial structure of the C.D.I.-attitude-measurement section is confirmed.

It is interesting that in our V.D.I.-modification we did unintentionally find other scales that come rather close to and are nearly equivalents of the A- and B-scales although not quite the same meaning.

Yet the factorial structure is not quite satisfactory for the purpose of measurement because half of the scales have significant loadings in more than one factor.

That means that if we made three superscales, summating the scores that load high in each of the three factors, there would be significant correlations between them.

It is not impossible that further research on the dimensions of attitudes toward educational and vocational decision making might demonstrate still other attitudinal aspects and result in scales that are more unidimensional.

In view of the indecision-scale that we identified it might be worth-

while in further research to study the measurement of vocational attitudes in combination with that of vocational problems.
Finally, other investigations have to demonstrate whether the Dutch scales measure developmental characteristics or kinds of personality traits.
We have compared the total scale means between higher and lower grades within the same types of school and many times we have not found significant differences.
But we cannot draw conclusions from these data because the sampling of our groups of students, although representative enough for test-construction, was not enough controlled for cross-sectional studies.
As for internal consistency and clarity of meaning, the A-, B-, P-, and Q-scales seem ready for application in the diagnosis of client-attitudes before counseling and for the evaluation of vocational guidance programs, if the objective of those programs is to promote goal-directive, active and concerned choice behaviour.

6. Another conclusion from our research is doubt of the possibility to measure knowledge of occupational and educational alternatives as a dimension.
This doubt is based on the low correlations between the items of the CDI Information scale and between those of the Cognitive Vocational Maturity Test. As you will remember we did not succeed in developing an adapted version of the CDI-C scale and there remained only a small part of the original CVMT.

A few possible reasons for these negative results follow now:

At first, all these tests have in common that they use multiple choice items, scored correct of false.
It is known that phi-correlations between dichotomous scales cannot reach the maximum-value of 1.0 when the p-values deviate considerably from .50. That might be the explanation for the number of low correlations that we have found.
However, another reason may be that the level of general occupational information can only be measured with a big sample of items, because what an individual knows about occupations in general is necessarily scrappy and a rather haphazard and small sample from an extensive field of information that can easily fill dictionaries and handbooks.

For both reasons one must conclude that reliably measuring the level of general occupational information demands a big number of items, like the C.V.M.T. has indeed.

Our experience has been that even for the measurement of rather specific occupational knowledge, the number of multiple choice items is not readily made large enough.

Our own attempts to construct Dutch occupational information scales were based on the rationale that measuring vocational maturity by means of testing occupational information, can better be done by checking how far the exploration has covered the information that is essential for a deliberate choice than by measuring the level of general occupational information.

To test this hypothesis we constructed an inventory consisting of 94 multiple choice items about only those professions and professional colleges that were open for the graduates of the h.a.v.o., the upper middle level school for continued education.

We tried to construct different scoring keys for students with different outlooks and choices, for example different for boys and girls, and other items for students with science subjects than for those with a business and administration preference.

In fact our results were as disappointing as they were for the tests of general occupational information. The correlations between the items were low and we did not succeed in constructing keys with a reasonable internal consistency.

From the six keys that we tried, the most satisfactory one was that for the science-interested students. It had 17 items and an internal consistency coefficient of .56.

So my final conclusion for this cross-national symposium must be that Holland is a better country for measuring vocational attitudes than for testing occupational information.

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